

ABSTRACT:

Parameter identification is critical for modern control strategies in electrical power systems which is considered both dynamic performance and energy efficiency. This paper presents a novel application of ANN observers in estimating and tracking Salient-Pole Synchronous Generator Dynamic Parameters using time-domain, on-line disturbance measurements. The data for training ANN Observers are obtained through off-line simulations of a salient-pole synchronous generator operating in a one-machine-infinite-bus environment. The Levenberg-Marquardt algorithm has been adopted and assimilated into the back-propagation learning algorithm for training feed-forward neural networks. The inputs of ANNs are organized in conformity with the results of the observability analysis of synchronous generator dynamic parameters in its dynamic behavior. A collection of ANNs with same inputs but different outputs are developed to determine a set of the dynamic parameters. The ANNs are employed to estimate the dynamic parameters by the measurements which are carried out within each kind of fault separately. The trained ANNs are tested with on-line measurements to identify the dynamic parameters. Simulation studies indicate the ANN observer has a great ability to identify the dynamic parameters of salient-pole synchronous generator. The results also show that the tests which have given better results in estimation of each dynamic parameter can be obtained.